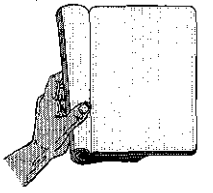
Chapter 4. Guide to Impact Analyses and Description of Land Use Assumptions

This chapter provides a road map for the impact analyses. It also explains some of the approaches used in assembling the range of land use changes that may occur as a result of CALFED Bay-Delta Program implementation.



4. Guide to Impact Analyses and Description of Land Use Assumptions

4.1 GUIDE TO IMPACT ANALYSES

This chapter is included to help readers understand how the impact analyses are presented in Chapters 5, 6, and 7. Information on the environmental consequences of the alternatives presented in this document was derived primarily from technical reports. These technical reports were prepared for many of the resource categories and form the basis for the affected environment and environmental consequences descriptions in the March 1998 Draft Programmatic EIS/EIR and Chapters 5, 6, and 7 of this report. Since the CALFED Bay-Delta Program (Program) alternatives described in this report incorporate elements of the alternatives presented in the March 1998 Draft Programmatic EIS/EIR and the impacts are similar, information in the technical reports was verified and used in these analyses, along with additional modeling runs for the operations and water supply.

This chapter is included to help readers understand how the impact analyses are presented in Chapters 5, 6, and 7.

Because a Preferred Program Alternative has been identified since the March 1998 Draft Programmatic EIS/EIR, the Program decided to rewrite the draft Programmatic EIS/EIR rather than update or supplement the March 1998 version. Comments received on the March 1998 Draft Programmatic EIS/EIR were catalogued, and many of the issues noted in those comments were incorporated into the revised program plans. Where possible, they are also identified and addressed in the impact analyses.

Resources evaluated in this Draft Programmatic EIS/EIR have been grouped into three main categories, as illustrated in Table 4-1.

- Physical environment
- Biological environment
- Land use, social issues, and economics

To provide a quick visual reference for the reader, a topic illustration is included in the footer for each resource. For example, the reference illustration for the air quality resource impact analysis is a hot air balloon.

Table 4-1. Resource Categories Evaluated in the Draft Programmatic EIS/EIR

CHAPTER 5
PHYSICAL ENVIRONMENT

- Water Supply and Water Management
- Bay-Delta Hydrodynamics and Riverine Hydraulics
- Water Quality
- Groundwater Resources
- Geology and Soils
- Noise
- Transportation
- Air Quality

CHAPTER 6
BIOLOGICAL ENVIRONMENT

- Fisheries and Aquatic Ecosystems
- Vegetation and Wildlife

CHAPTER 7
LAND USE, SOCIAL ISSUES, AND ECONOMICS

- Agricultural Land and Water Use
- Agricultural Economics
- Agricultural Social Issues
- Urban Land Use
- Urban Water Supply Economics
- Utilities and Public Services
- Recreation Resources
- Flood Control
- Power Production and Energy
- Regional Economics
- Cultural Resources
- Public Health and Environmental Hazards
- Visual Resources
- Environmental Justice
- Indian Trust Assets

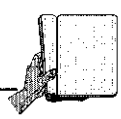
The organization of a typical resource discussion is depicted in Figure 4-1. The impact analysis for most resource categories is divided into several parts, including a summary, a description of the affected environment/existing conditions, and discussions of environmental consequences—including such topics as cumulative and growth-inducing impacts. Each of these divisions is explained more fully below.

The impact analysis for most resource categories is divided into several parts, including a summary, a description of the affected environment/existing conditions, and discussions of environmental consequences—including such topics as cumulative and growth-inducing impacts.

Summary. The summary provides the conclusions of the detailed impact analysis. It gives an overview of the benefits and potentially significant adverse impacts that could result from implementing the Program, and lists possible mitigation strategies to lessen potentially significant impacts. Information presented in the summary for reach resource is the basis for the summary comparison of impacts presented in Chapter 3.

Areas of Controversy. Under CEQA, areas of controversy include differences of opinion among technical experts or areas of uncertainty for which information is not available and cannot be readily obtained. Areas of controversy were identified by comments from CALFED agencies, public comments, and new information developed since the March 1998 Draft Programmatic EIS/EIR. For some resources, issues that do not meet the CEQA definition for areas of controversy have been raised by a number of people. For recreation resources, for example, the effects on motorized boating in the Delta or of flooding free-flowing rivers by enlarging existing reservoirs are areas of concern that do not meet the CEQA definition for areas of controversy. These types of issues also are noted in the "Areas of Controversy" section. Although listing areas of concerns is not required by NEPA or CEQA, the Program decided to acknowledge concerns mentioned in the public review process. In most cases, the concerns are addressed in the impact

Under CEQA, areas of controversy include differences of opinion among technical experts or areas of uncertainty for which information is not available and cannot be readily obtained.



analyses. In some cases, however, the concerns cannot be addressed at the programmatic level and will need to be addressed in second-tier documents.

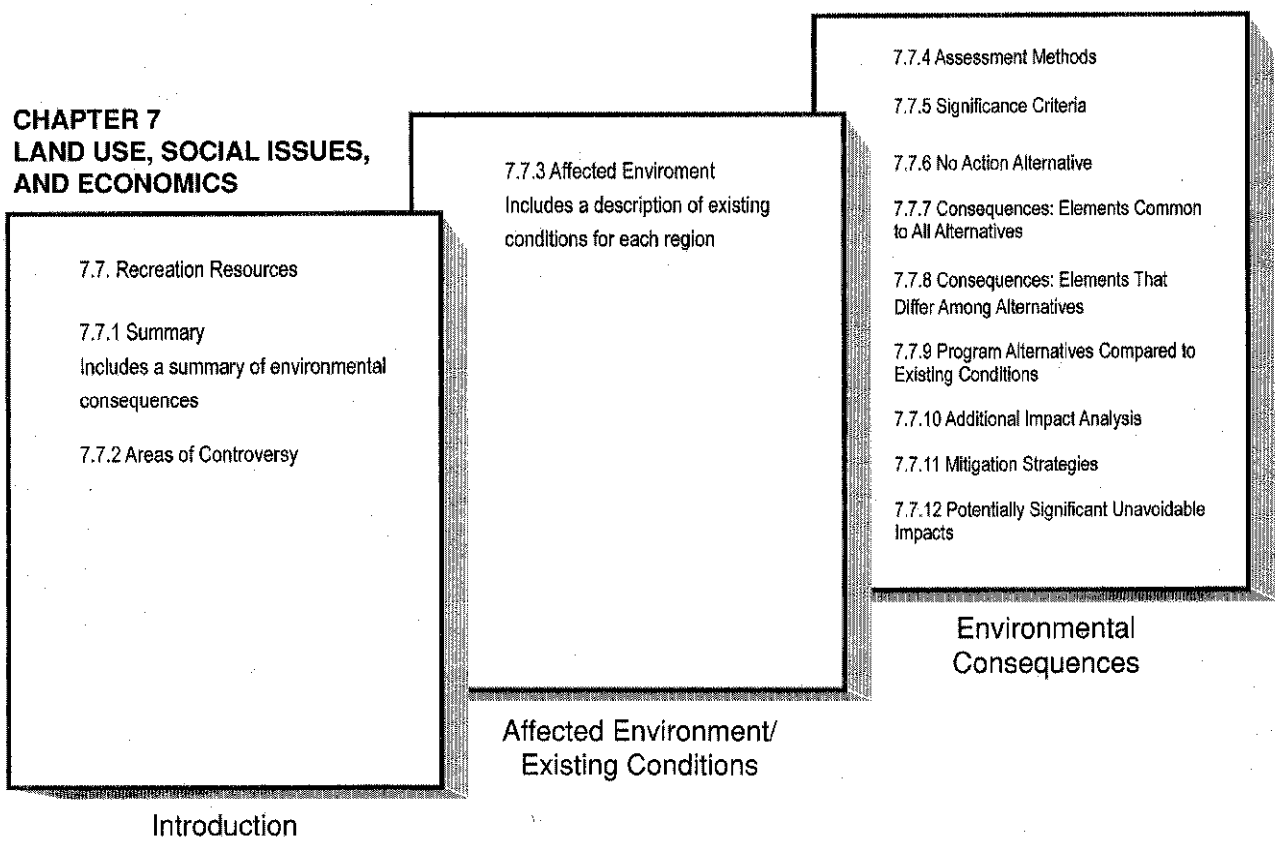


Figure 4-1. Organization of a Resource Discussion Using Recreation as the Example

Affected Environment/Existing Conditions. The "Affected Environment/Existing Conditions" section provides a historical perspective and an overview of the current conditions for each resource. The description of current conditions uses the most recent information available. The discussions are organized by region, in the following order:

- Delta Region
- Bay Region
- Sacramento River Region
- San Joaquin River Region
- Other SWP and CVP Service Areas

The regulatory framework that is part of the existing conditions can be found in Section 3 of Chapter 8, "Compliance with Applicable Laws, Policies, and Plans and Regulatory Framework."

Program regions are combined into a single discussion when their existing conditions/affected environment discussions are similar. Upper watershed descriptions for each resource are discussed, where appropriate, under the various regions.

Assessment Methods. Descriptions of assessment methods are resource specific, and provide the approach used to identify and assess the environmental consequences for the resource category. Analytical models used in the evaluation also are identified.

Significance Criteria. Because of the general nature of the planning process and the broad range of programmatic actions being considered, qualitative thresholds of significance generally are used.

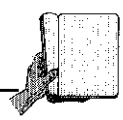
These qualitative and general criteria provide the basis for establishing more specific or quantitative thresholds to be used in the project-specific, second-tier environmental documents. When specific actions are identified in Phase III, significance criteria will be expressed in quantitative terms or measurable performance criteria based on site-specific data.

No Action Alternative. This section presents the environmental consequences of the No Action Alternative compared to existing conditions. The No Action Alternative makes predictions about the future condition of environmental resources, taking into consideration recently constructed projects and projects under construction. For the No Action Alternative, assumptions are made about existing trends that may continue into the future and about water project operations. For example, urbanization that is expected to continue would require additional land and water resources, with consequences on a variety of environmental resources. A list of projects included in the No Action Alternative impact analysis and water operation modeling assumptions are provided in Attachment A.

The Program has not selected a specific conveyance alignment or the location of any other structure or action mentioned in any discussions in this document. These selections will not occur until Phase III and would involve extensive study and interaction with all interested parties.

The impacts of each of the four Program alternatives are compared to both the No Action Alternative and the existing conditions/affected environment in Chapters 6, 7, and 8 of the impact analysis section of this Programmatic EIS/EIR. Under the No Action Alternative, it is assumed that certain changes in the environment will occur regardless of whether any of the alternatives are implemented. For example, it is anticipated that trends in population growth and urbanization will continue, but the rate at which these trends will continue and the locations where they will occur cannot be projected except very generally. The same is true for any environmental impacts caused by growth and urbanization. It is likely that these changes would result in potentially significant impacts on the resources evaluated (land use, air quality, water quality, vegetation and wildlife, fisheries, and others), but there is no accurate way to predict how severe those impacts may be or where they will occur.

Because of the broad programmatic nature of the project, the 20- to 30-year planning horizon, and the imprecise understanding of future conditions, it is difficult to distinguish in any meaningful way the differences between the conditions under the No Action Alternative and existing conditions. Consequently, the environmental impacts of the



actions included in the Program alternatives when compared to existing conditions are described as being very similar to the impacts of those alternatives when compared to what is expected to happen under a future no-action scenario.

Program Alternatives. This section presents the consequences of the four Program alternatives, the reasons why social and economic effects are not considered a significant impact on the environment, and deviations from the format outlined in this chapter.

Under CEQA, an economic or social change by itself is not considered a significant impact on the environment. If the analysis can trace a chain of cause and effect from a proposed project through anticipated economic or social changes resulting from the project to physical changes caused in turn by the economic or social changes, it may be considered a significant impact. The focus of the analysis is on the physical changes to the environment, and economic or social changes do not have to analyzed in any detail greater than necessary to trace a chain of cause and effect. However, economic or social effects of a project can be used to determine the significance of physical changes caused by a project, and should be considered (together with technological and environmental factors) in deciding whether changes in a project are feasible to reduce or avoid the significant effects on the environment identified in the EIR. In the interest of full disclosure, the Program presents an overview of the social and economic potential effects of Program implementation.

Under CEQA, an economic or social change by itself is not considered a significant impact on the environment.

For most resources, Levee System Integrity Program actions would affect only the Delta and Bay Regions, and the program is not discussed for other Program regions. The Levee System Integrity Program impacts on Suisun Marsh are discussed under the "Bay Region."

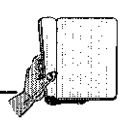
Because of the system-wide nature of the resource, the power and energy section is presented in a system-wide format. The water supply and Bay-Delta hydrodynamics and riverine hydraulics sections modify the definition of the San Joaquin River Region and the Other SWP and CVP Service Areas to better describe consequences affecting water supplies in those regions.

For most resources, Levee System Integrity Program actions would affect only the Delta and Bay Regions, and the program is not discussed for other Program regions. The Levee System Integrity Program impacts on Suisun Marsh are discussed under the "Bay Region."

Program Elements with Consequences Common to All Alternatives. This section presents the environmental consequences of the Program elements that are similar to all alternatives. Generally, the environmental consequences of all Program elements are the same for each alternative. This description of environmental consequences also is presented by Program region. For brevity, regions are combined when environmental consequences are similar.

Program Elements with Consequences That Differ Among Alternatives. The consequences of Program elements that differ among the alternatives primarily are associated with conveyance in the Delta Region; therefore, this section is presented by alternative rather than by region. Other regions are included as subsections, where applicable. For brevity, Program regions are combined where environmental consequences are similar.

Program Alternatives Compared to Existing Conditions. Under CEQA, the Program is required to analyze the effects of the Program alternatives compared to existing conditions and



compared to the No Action Alternative. The effect of using the existing conditions as the baseline for determining environmental consequences is presented in this section. This discussion ensures that all potentially significant impacts are identified. In most cases, because of the programmatic nature of the environmental assessment and long planning horizon, the conditions present under the existing conditions baseline are similar to those under the No Action Alternative. In these situations, differences between existing conditions and No Action Alternative cannot be distinguished at the programmatic level, and the results of comparison of each alternative to the No Action Alternative and to existing conditions are the same. Where potential meaningful differences exist between the comparison to existing conditions and the No Action Alternative, the differences are identified and discussed in the this section.

Additional Impact Analysis. Four other topics are included in the impact analysis: cumulative impacts, growth-inducing impacts, the relationship between short-term uses of the environment and maintaining and enhancing long-term productivity, and irreversible and irretrievable commitments of resources. A summary of each of these topics is included in Chapter 3, and they are described below.

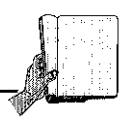
Cumulative Impacts. Cumulative impacts are defined as impacts on the environment that result from the incremental impact of the proposed action when added to other past, present, and reasonably foreseeable future actions undertaken by the same or other agencies or persons. Program actions may be implemented in an interactive manner with other concurrent and subsequent projects. The non-Program actions implemented concurrently with the Program may affect the results of implementing the Program and may result in impacts different than those associated with implementing only Program actions. A description of the programs and projects considered in the cumulative impact analysis is provided in Attachment A.

In general, the analysis of cumulative impacts is qualitative. Impacts were identified based on: (1) information extracted from available environmental documents or studies for the resource categories potentially affected by each project, and (2) knowledge of expected effects of similar projects in the study area. Because of the preliminary phase of most of the projects considered (environmental reviews have not been initiated, drafted, or finalized), comparable environmental information for identifying cumulative impacts was sparse.

In general, the cumulative impact analysis is qualitative. Cumulative impacts were based on resources potentially affected by each project in concert with Program actions.

Growth-inducing Impacts. This section describes actions associated with the Program that could foster economic or population growth; result in construction of additional housing, either directly or indirectly; or remove obstacles to population growth. How population growth could affect existing community services also is considered in this section. Further, this section addresses how growth could lead to disturbances of resources. For example, water supply reliability could lead to growth, and that additional growth could affect geology and soil.

For the following resources, the cumulative impacts and growth-inducing impacts are referred to as Cumulative Effects and Growth-Inducing Effects, and are not treated as



significant direct environmental impacts: agricultural economics, agricultural social issues, urban water supply economics, regional economics, and environmental justice (see second paragraph under "Program Alternatives" on page 4-5).

Relationship Between Short-Term Uses and Long-Term Productivity. This section discusses the relationship between local short-term uses of the environment and the maintenance and enhancement of long-term productivity. Resource-specific summaries of the short-term uses in the project areas and the maintenance and enhancement of long-term productivity in those areas are provided.

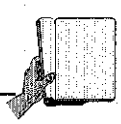
Irreversible and Irretrievable Commitments. This section fulfills the requirement to address irreversible and irretrievable commitments of resources. Irreversible impacts are those that cause, through direct or indirect effects, use or consumption of resources in such a way that they cannot be restored or returned to their original condition despite mitigation. If unavoidable, potentially irreversible impacts are documented in this report. An irretrievable impact or commitment of resources occurs when a resource is removed or consumed. These types of impacts are evaluated to ensure that consumption is justified.

Mitigation Strategies. Because this Draft Programmatic EIS/EIR does not evaluate site-specific actions, no specific mitigation measures or monitoring plans are presented. Instead, general mitigation strategies are identified as ways to avoid, minimize, restore, or compensate for potentially significant adverse impacts. For some resources, specific mitigation measures are provided to display the array of techniques available in order to carry out the strategy. For example, construction activities can cause erosion of soils that leads to adverse impacts on water quality. A mitigation strategy would be to avoid and minimize the impact. Mitigation measures available to carry out this strategy include conducting work during dry periods and using erosion-control fencing or straw bales, water detention basins, and so forth.

Because this draft Programmatic EIS/EIR does not evaluate site-specific actions, no specific mitigation measures or monitoring plans are presented. Instead, general mitigation strategies are identified.

The economic and social information analyses (agricultural economics, agricultural social issues, urban water supply economics, regional economics, and environmental justice) do not contain a mitigation strategies section. However, the Program has presented possible methods to alleviate potential adverse effects on these resources in the discussion of potential effects.

Potentially Significant Unavoidable Impacts. The final section is a discussion of potentially significant unavoidable impacts for each resource category. This section identifies potentially significant adverse impacts that remain significant even after implementing mitigation strategies and measures. For the economic and social information analyses, this section is titled Adverse Effects.



4.2 CEQA DOCUMENT REQUIREMENTS

CEQA requires that certain subjects be documented in an environmental impact analysis. The following explanation is provided to assist the reader in locating these subjects. The locations of discussions about the subjects are noted following each subject.

- Affected environment. Descriptions of the affected environment are in Chapters 5, 6, and 7. This section includes discussions about historical and existing conditions.

- The potentially significant environmental effects of the proposed project. Chapter 3 provides a table of all potentially significant environmental effects of the Preferred Program Alternative. The potentially significant environmental effects of each of the alternatives are discussed by resource category in Chapters 5, 6, and 7.

- Any potentially significant environmental effects that cannot be avoided if the proposal is implemented. Each resource category begins with a summary. Potentially significant environmental effects that cannot be avoided are noted in these summaries.

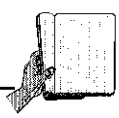
- Cumulative impacts. Cumulative impacts are addressed in each resource category in Chapters 5, 6, and 7. Chapter 3 contains a table of all potentially significant environmental effects, including significant and unavoidable impacts. Similarly, the potentially significant environmental effects that cannot be avoided are discussed by resource category in Chapters 5, 6, and 7.

- Mitigation measures proposed to minimize the potentially significant effects. Since this is a programmatic EIS/EIR, site-specific actions are not evaluated. Accordingly, no specific mitigation measures or monitoring plans are presented, but general mitigation strategies and a general mitigation monitoring plan are provided. Mitigation strategies can be found in the summaries and text for each resource in Chapters 5, 6, and 7. The draft programmatic mitigation monitoring plan is included in Chapter 9.

- Alternatives to the proposed action including the No Action (or "No Project") Alternative and the environmentally superior (or "environmentally preferable") alternative. Chapter 2 describes alternatives, and Section 2.3 discusses the environmentally superior alternative.

- Growth-inducing impacts of the proposed action. These impacts are discussed in Chapter 3 and addressed in the environmental consequences sections of Chapters 5, 6, and 7.

- The relationship between local short-term uses of mankind's environment and the maintenance and enhancement of long-term productivity. This relationship is



summarized in Chapter 3 and addressed in the environmental consequences sections of Chapters 5, 6, and 7.

- Any significant irreversible environmental changes that would be involved in the proposed action should it be implemented. These changes are discussed in Chapter 3 and addressed in the environmental consequences sections of Chapters 5, 6, and 7.

- Summary (with major conclusions, areas of controversy, and issues to be resolved). A summary is included in each impact analysis for all resource categories.

- Project description. The project description is found in Chapter 1. This discussion includes the Program purpose and need, Program goals and objectives, Program solution principles, Program study area and geographic scope, and the next steps in the process.

4.3 ESTIMATED LAND USE CHANGES DUE TO THE PROGRAM

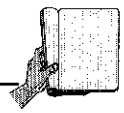
Because of the general and programmatic nature of this document, it is impossible to specifically define the land use changes that will result from implementing the Program. The extent and specific locations of the Program actions have yet to be decided. To evaluate the environmental consequences of Program actions at a programmatic level, it is necessary to estimate the amount of land that could be disturbed by Program actions. The Program identified the maximum ranges of acreage that could be affected by the various Program elements to give decision makers and the public a sense of the "worst-case" land use impact.

The Program identified the maximum ranges of acreage that could be affected by the various program elements to give decision makers and the public a sense of the "worst-case" land use impact. Although these acreage estimates are possible, the affected acreage likely would be considerably less, depending on measures to avoid, minimize, or mitigate these actions.

Although impacts in the range of these acreage estimates are possible, the affected acreage likely would be considerably less because these estimates do not include reductions in the land use changes that could take place based on measures that may be implemented in Phase III to avoid, minimize, or mitigate these changes.

Because the Ecosystem Restoration Program actions could affect the largest amount of land, particularly agricultural lands, information is offered to illustrate actions that could be taken during Phase III to minimize the extent of lands, particularly in the Delta, adversely affected by the Program. The environmental, economic, and social consequences of these proposed land use changes and other adverse and beneficial impacts associated with the Program can be found in Chapters 5, 6, and 7.

Estimated land use changes are presented here as well as in the various environmental consequences discussions to provide a system-wide perspective regarding potential land use conversions and to reduce repetition in the document.



Other Program elements most likely to influence land use changes are water quality, levee system integrity, storage, and conveyance. The Water Transfer Program may influence land use changes if transfers from agriculture to urban or environmental uses are facilitated by the program. The extent of these potential changes are not known at the present time. Water Use Efficiency and Watershed Program measures are not expected to directly affect current land uses; therefore, no estimates of land changes relating to these programs are presented.

4.3.1 ECOSYSTEM RESTORATION PROGRAM

Table 4-2 summarizes the actions currently contemplated, along with estimates of the acreage that could be affected by each action.

Table 4-2. Estimate of Land Area Affected by the Ecosystem Restoration Program (in acres)

HABITAT TYPE	BAY REGION	DELTA REGION	SACRAMENTO RIVER REGION	SAN JOAQUIN RIVER REGION
Tidal perennial aquatic	1,500	7,000	0	0
Tidal perennial aquatic (shoals)	0	500	0	0
Nontidal perennial aquatic	1,600	2,600	0	1,000
Tidal sloughs	280-420	600-1,200	0	0
Midchannel islands	0	200-800	0	0
Fresh emergent wetland (tidal)	0	30,000-45,000	0	0
Fresh emergent wetland (nontidal)	0	14,500-17,000	0	0
Seasonal wetland	0	30,000	0	0
Riparian	160-360	1,000-1,500	6,500-7,000	700-1,300
Saline emergent wetland (tidal)	7,500-12,000	0	0	0
Stream meander corridor	0	0	19,000-27,000	1,500-2,000
Perennial grassland	4,000	4,000-6,000	0	0
Total acres	**15,040-19,880**	**90,400-111,600**	**25,500-34,000**	**3,200-4,300**

The Ecosystem Restoration Program would coordinate and assist in restoration activities currently under way and future activities that could lead to the habitat restoration goals identified in the program.

The Ecosystem Restoration Program would coordinate and assist in restoration activities currently under way and future activities that could lead to the habitat restoration goals identified in the program. For example, actions under the Central Valley Project Improvement Act and the Central Valley Habitat Joint Venture are designed to protect and restore significant areas of land in the Central Valley. To the extent that these

activities and programs establish habitat that is proposed in the Ecosystem Restoration Program, the amount of land needed to achieve the Ecosystem Restoration Program goals would be reduced.

The Program would take a variety of steps to reduce effects on farmland, including:

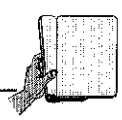
- Implementation of the Ecosystem Restoration Program would occur over many years. The implementation process would include extensive local community, landowner, and stakeholder involvement.
- Habitat restoration efforts would focus first on developing habitat on public land where appropriate.
- If no public land is available, restoration efforts would focus next on land acquired from willing sellers and that provides substantial benefits for ecological processes, habitat, or species.
- Where small parcels of land are needed for waterside habitat, acquisition efforts would seek out points of land on islands where the ratio of levee miles to acres farmed is high.
- The Program would obtain easements on existing farmland that would allow for minor changes in agricultural practices, thus increasing the value of the crops to wildlife.
- Where possible, floodplain restoration efforts would include provisions for continued agricultural practices, which would be renewed on an annual basis.

4.3.2 WATER QUALITY PROGRAM

Facilities to control and treat various discharge effluents would directly affect current land uses. The extent and locations of these facilities are unknown at this time; consequently, the acreage that could be affected cannot be forecast in a meaningful way. These facilities will need to be evaluated for environmental impacts when the facilities are being planned.

Facilities to control and treat various discharge effluents would directly affect current land uses. The extent and locations of these facilities are unknown at this time; consequently, the acreage that could be affected cannot be forecast in a meaningful way.

The drainage management problem areas on the west side of the San Joaquin Valley are included in the No Action Alternative. This document assumes that land retirement in the area will take place even if the Program does not proceed. The Water Quality Program also has identified this drainage management problem as a water quality issue and intends to facilitate the retirement effort as part of the Water Quality Program element. This action could affect a maximum of 37,000 acres and be carried out in accordance with the September 1990 "A Management Plan for Agricultural Subsurface Drainage and Related Problems on the West Side San Joaquin Valley."



4.3.3 LEVEE SYSTEM INTEGRITY PROGRAM

Levee restoration would cause both temporary and permanent land disturbance near existing levees. Land disturbed temporarily during construction would be restored through revegetation and likely would return to preconstruction conditions. These temporary losses are estimated at between 1,000 and 1,500 acres. Other land would be permanently affected by the larger footprint of the new levees. Levee reconstruction could require approximately 15,000 acres. About 625 of the 1,100 miles of Delta levees would be upgraded, and a 200-foot-wide piece of land is needed for each levee mile. The Program also projected that 100 miles of setback levees could be constructed, affecting an area 500 feet wide per levee mile. Subsidence control could affect about 14,000 acres. In total, an estimated range of 34,000-35,000 acres could be permanently affected by the Levee System Integrity Program. These estimates are the upper range of the possible acreage that could be affected. The Program will refine these estimates as the process continues.

Suisun Marsh levee restoration also would result in land disturbance. Assuming a similar footprint as the Delta levees, restoration of the Suisun Marsh levees could affect from 5,000 to 5,600 acres. Affected land uses are primarily wildlife habitat.

4.3.4 STORAGE

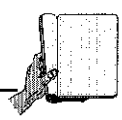
Acreage permanently affected by constructing or modifying storage facilities would be determined by the number, size, and location of sites eventually selected for those facilities. A range of additional groundwater storage also is included in the alternatives. Table 4-3 shows preliminary calculations of land that could be affected by the footprint of new storage facilities. Several representative storage sites were examined to provide a better perspective on the potential magnitude of land use changes, as well as other storage-related consequences. It is likely that land use impacts would extend beyond the reservoir site itself. The actual areas and land uses that would be affected depend on the siting, design, and operation of the reservoir. This information will be developed in subsequent project-specific environmental documents.

Several representative storage sites were examined to provide a better perspective on the potential magnitude of land use changes, as well as other storage-related consequences.

The following sites were investigated as examples for preliminary land use change analysis in this document:

- Sites/Colusa and Thomes-Newville Reservoir sites were selected to represent surface water storage on Sacramento River tributaries. Assuming a storage capacity of 3 MAF, the potential land affected by a new reservoir could range from 16,700 acres (Thomes-Newville) to 29,600 acres (Sites/Colusa). This range is included in the Sacramento River Region in Table 4-3.

- The Montgomery Reservoir site was the representative example for surface water storage on San Joaquin River tributaries. Assuming a storage capacity of 500 thousand acre-feet (TAF), the land that would be affected by a new reservoir at this site was



estimated at 8,050 acres. This value is included in the San Joaquin River Region in Table 4-3.

- Groundwater storage was estimated at 1,500 acres in both the Sacramento River and San Joaquin River Regions. These values are included in the respective regional areas in Table 4-3.

- The Los Vaqueros Reservoir site was the example for the surface water storage off-aqueduct option. Assuming a storage capacity of 1 MAF, the potential land affected by enlarging the existing reservoir was estimated at 7,000 acres. This value is included in the San Joaquin River Region in Table 4-3.

- Victoria, Bacon, Holland, and Woodward Islands were the example sites for the in-Delta storage. The sites occupy an area of 18,000-19,500 acres. These values are included in the Delta Region in Table 4-3.

4.3.5 CONVEYANCE

The estimated amounts of land area (for example, agriculture, and fish and wildlife habitat) that would be affected by conveyance features are shown in Table 4-3.

Table 4-3. Estimates of Land Area Affected by Storage and Conveyance (in acres)

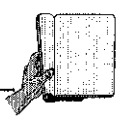
	DELTA REGION		SACRAMENTO RIVER REGION	SAN JOAQUIN RIVER REGION	ALL REGIONS
ALTERNATIVE	STORAGE[1]	CONVEYANCE	STORAGE[1]	STORAGE[1]	TOTAL
PPA[2]	0-15,000	100-4,500	0-32,000	0 to16,600	100-68,100
1	0-15,000	100-400	0-32,000	0 to16,600	100-64,000
2	0-15,000	4,000-4,500	0-32,000	0 to16,600	4,000-68,100
3	0-15,000	4,500-6,000	0-32,000	0 to16,600	4,500-69,600

Note:
PPA = Preferred Program Alternative.

* Estimates assume that channel capacity is enlarged by using setback levees; if dredging is used to enlarge channel capacity, less land would be required. For each configuration, the estimate of land area associated with conveyance changes is based on the following: operable Old River barrier—100 acres; channel enlargement along Old River—300 acres; screened intake near Hood and north Delta channel modifications—3,500-4,000 acres; and isolated open channel (45 miles long and 1,000 feet wide)—4,000-5,000 acres. Range of storage is the same for all alternatives. The upper end of the range reflects the variation possible, depending on which size reservoir is eventually selected.

[1] Average does not include lands that might be affected outside of the reservoir site.
[2] Preferred Program Alternative conveyance estimate ranges from without a pilot diversion facility to including a facility.

Program activities could affect lands designated as prime farmland, unique farmland, and farmland of state-wide importance. Table 4-4 summarizes the acreages by farmland type



that could be affected by the Program. Except as noted, the acreage estimates assume that all Program activities would occur on these three types of farmland.

In addition to the long-term land use changes, the Program expects that construction activities will result in temporary conversion of additional agricultural land. Mitigation necessary to offset impacts on wildlife as a result of implementing the levee system integrity, water quality, conveyance, and storage elements may affect additional agricultural lands.

Table 4-4. Estimates of Area of Important Farmland Affected by Program Elements (in acres)

		ECOSYSTEM RESTORATION PROGRAM[2]			LEVEE SYSTEM INTEGRITY PROGRAM[2,5]			STORAGE[3]			CONVEYANCE[2,5,6]			WATER QUALITY PROGRAM[1,2,4]	
ALTERNATIVE/REGION		P	S	U	P	S	U	P	S	U	P	S	U	0	TOTAL
PPA	Delta	85,800-101,600	3,200-6,500	1,400-3,500	31,000	2,500-3,000	500-1,000	0-14,000[2]	0-1,000[2]	0	100-3,800	0-200	0-500	0	124,500-166,100
	Sacramento River	21,700-28,800	3,300-3,900	600-1,300	0	0	0	0	0	0	0	0	0	0	25,600-34,000
	San Joaquin River	3,500-5,000	400-500	100-300	0	0	0	0	0	0	0	0	0	37,000	41,000-42,800
	Total	111,000-135,400	6,900-10,900	2,100-5,100	31,000	2,500-3,000	500-1,000	0-14,000	0-1,000	0	100-3,800	0-200	0-500	37,000	191,100-242,900
1	Delta	85,800-101,600	3,200-6,500	1,400-3,500	31,000	2,500-3,000	500-1,000	0-14,000[2]	0-1,000[2]	0	100-300	0-100	0	0	124,500-162,000
	Sacramento River	21,700-28,800	3,200-3,900	600-1,300	0	0	0	0	0	0	0	0	0	0	25,500-34,000
	San Joaquin River	3,500-5,000	400-500	100-300	0	0	0	0	0	0	0	0	0	37,000	41,000-42,800
	Total	111,000-135,400	6,900-10,900	2,100-5,100	31,000	2,500-3,000	500-1,000	0-14,000	0-1,000	0	100-300	0-100	0	37,000	191,100-238,800
2	Delta	85,800-101,600	3,200-6,500	1,400-3,500	31,000	2,500-3,000	500-1,000	0-14,000[2]	0-1,000[2]	0	3,500-3,800	100-200	400-500	0	128,400-166,100
	Sacramento River	21,700-28,800	3,200-3,900	600-1,300	0	0	0	0	0	0	0	0	0	0	25,500-34,000
	San Joaquin River	3,500-5,000	400-500	100-300	0	0	0	0	0	0	0	0	0	37,000	41,000-42,800
	Total	111,000-135,400	6,900-10,900	2,100-5,100	31,000	2,500-3,000	500-1,000	0-14,000	0-1,000	0	3,500-3,800	100-200	400-500	37,000	195,000-242,900
3	Delta	85,800-101,600	3,200-6,500	1,400-3,500	31,000	2,500-3,000	500-1,000	0-14,000[2]	0-1,000[2]	0	4,000-4,800	300-900	200-300	0	128,900-167,600
	Sacramento River	21,700-28,800	3,200-3,900	600-1,300	0	0	0	0	0	0	0	0	0	0	25,500-34,000
	San Joaquin River	3,500-5,000	400-500	100-300	0	0	0	0	0	0	0	0	0	37,000	41,000-42,800
	Total	111,000-135,400	6,900-10,900	2,100-5,100	31,000	2,500-3,000	500-1,000	0-14,000	0-1,000	0	4,000-4,800	300-900	200-300	37,000	195,400-244,400

Notes:

Types of Farmland
- Prime (P) - Land with the best combination of physical and chemical features for the production of agricultural crops.
- State-wide importance (S) - Land with a good combination of physical and chemical features for the production of agricultural crops.
- Unique (U) - Land of lesser quality soils used for the production of the state's leading agricultural cash crops.

PPA = Preferred Program Alternative.

[1] Acreages of farmland of state-wide importance cannot be accurately estimated at this time because mapping has not been completed in the San Joaquin River Region. It is possible that farmland of state-wide importance would be affected by the Water Quality Program in the Grasslands area of the San Joaquin River Region.

[2] Estimates assume that all land conversion occurs on lands currently in use for agricultural purposes.

[3] Outside the Delta, estimates assume that potential storage reservoirs sites are typically foothill grasslands and do not contain significant amounts of important farmland; small amounts of important farmland could be affected if reservoirs are sited in valleys containing alluvial deposits that support important agricultural farmland.

[4] Total includes maximum acreage potentially affected by the Water Quality Program.

[5] Estimates assume that all Delta channel capacity is enlarged by constructing setback levees; if dredging is used to enlarge channel capacity, less land would be required.

[6] Preferred Program Alternative estimate ranges from without a pilot diversion facility to including a facility.